

AMENDMENTS TO THE CLAIMS

1.-13. (Cancelled)

14. (New) A pixel interpolation circuit for interpolating a missing pixel in an image, comprising:

a plurality of mean preserving interpolation calculation circuits for determining values of candidate interpolation data DI for the missing pixel such that a mean value of a plurality of pixels constituting an inclusive group of pixels including the missing pixel is equal to a mean value of a plurality of pixels constituting a non-inclusive group of pixels not including the missing pixel but being disposed near the missing pixel and having the same number of pixels as the inclusive group of pixels, each mean preserving interpolation calculation circuit also selecting one of the plurality of pixels disposed near the missing pixel as a test pixel T, and determining a value of test interpolation data TD for the test pixel such that a mean value of a plurality of pixels equal in number to the inclusive group and including the test pixel is equal to a mean value of a plurality of pixels equal in number to the non-inclusive group of pixels and not including the test pixel but being disposed near the test pixel;

a left-right mean interpolation calculation circuit for determining a mean value of pixels disposed on the left and right of the missing pixel as interpolation candidate data D0 and determining a mean value of pixels on the left and right of each said test pixel as test interpolation data TD0; wherein

mutually differing numbers of pixels k1-kn in said inclusive group of pixels and said non-inclusive group of pixels are set in the mean preserving interpolation calculation circuits, which determine a plurality of interpolation candidate data DI1-Din and test interpolation data TD1-TDn; further comprising

a marking circuit for calculating a difference between actual image data of the test pixels and each of the plurality of test interpolation data TD0-TDn calculated by the left-right

interpolation calculation circuit and the mean preserving interpolation calculation circuits as marking data M0-Mn; and

an output circuit for outputting the interpolation candidate data calculated by the circuit having minimum marking data, among the left-right mean interpolation calculation circuit and the mean preserving interpolation calculation circuits, as interpolation data IP for the missing pixel.

15. (New) The pixel interpolation circuit of claim 14, further comprising an output limiting circuit for limiting values of the interpolation candidate data of each of the mean preserving interpolation calculation circuits according to a maximum value Lmax and a minimum value Lmin of the plurality of pixels disposed near the missing pixel.

16. (New) An image scanner comprising:

an imager unit having a connected plurality of imaging elements and outputting an image signal of an image scanned by the imaging elements;

an A/D converter unit for converting the image signal output from the imager unit to digital pixel data; and

the pixel interpolation circuit of claim 14; wherein the pixel interpolation circuit calculates interpolation pixel data for interpolating missing pixels not present in the digital image data.

17. (New) The image scanner of claim 16, further comprising a compensator unit for receiving the digital image data output from the A/D converter, correcting the digital image data to compensate for variations in characteristics of the imaging elements, and outputting the digital image data to the pixel interpolation circuit.

18. (New) The image scanner of claim 16, further comprising:

means for dividing the image signal output from the imaging unit into a plurality of parts per line and outputting the parts in parallel;

a plurality of sample-and-hold circuits for sampling and holding the image signals output in parallel; and

a selection means for selecting the sample-and-hold circuits sequentially; wherein the image signal output by the selection means is input to the A/D converter.

19. (New) The image scanner of claim 16, wherein:

the imaging elements include a plurality of devices sensitive to a plurality of colors, for outputting pixel signals corresponding to each color;

the A/D converter converts the image signal corresponding to each color to digital image data; and

the pixel interpolation circuit calculates interpolation pixel data interpolating the missing pixel on the basis only of image data of pixels of the same color in the digital image data.

20. (New) A pixel interpolation method for interpolating a missing pixel in an image, comprising:

a plurality of mean preserving interpolation calculation steps for determining values of candidate interpolation data DI for the missing pixel such that a mean value of a plurality of pixels constituting an inclusive group of pixels including the missing pixel is equal to a mean value of a plurality of pixels constituting a non-inclusive group of pixels not including the missing pixel but being disposed near the missing pixel and having the same number of pixels as the inclusive group of pixels, each mean preserving interpolation calculation step also selecting one of the plurality of pixels disposed near the missing pixel as a test pixel T, and determining a value of test interpolation data TD for the test pixel such that a mean value of a plurality of

pixels equal in number to the inclusive group and including the test pixel is equal to a mean value of a plurality of pixels equal in number to the non-inclusive group of pixels and not including the test pixel but being disposed near the test pixel;

a left-right mean interpolation calculation step for determining a mean value of pixels disposed on the left and right of the missing pixel as interpolation candidate data D0 and determining a mean value of pixels on the left and right of each said test pixel as test interpolation data TD0; wherein

mutually differing numbers of pixels k1-kn in said inclusive group of pixels and said non-inclusive group of pixels are set in the mean preserving interpolation calculation steps, which determine a plurality of interpolation candidate data DI1-Din and test interpolation data TD1-TDn; further comprising

a marking step for calculating a difference between actual image data of the test pixels and each of the plurality of test interpolation data TD0-TDn calculated by the left-right interpolation calculation step and the mean preserving interpolation calculation steps as marking data M0-Mn; and

an output step for outputting the interpolation candidate data calculated by the interpolation calculation step having minimum marking data, among the left-right mean interpolation calculation step and the mean preserving interpolation calculation steps, as interpolation data IP for the missing pixel.

21. (New) The pixel interpolation method of claim 20, further comprising an output limiting step for limiting values of the interpolation candidate data in each of the mean preserving interpolation calculation steps according to a maximum value Lmax and a minimum value Lmin of the plurality of pixels disposed near the missing pixel.